A Commonsense Approach to Intelligence, Surveillance, and Reconnaissance Operations

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In the summer of 2015, Department of Defense officials announced that combat air patrols (CAP) conducted by remotely piloted aircraft (RPA) would increase steadily, from 65 per day in October to 90 per day by the end of 2019.[1] Undoubtedly, this four-year-long expansion of the department's intelligence, surveillance, and reconnaissance (ISR) capabilities reflects the ever-increasing demand for tactical reconnaissance using MQ-1 Predators and MQ-9 Reapers to monitor current and anticipated crises abroad. According to February 2016 figures, the US Air Force and its distributed common ground system (DCGS) fly 61 CAPs per day.[2] Looking forward four years' time, without significant increase in either US or allied involvement, one can assume that the Islamic State's territory and influence will continue to expand and that new conflict zones—perhaps in the South China Sea or the Baltic States—will emerge. If so, then the Air Force should expect that the demand for ISR and full-motion-video-based products from its intelligence operators will probably exceed the means to provide them.

Granted, the Department of Defense is taking a combined approach. The US Army and contractors will assume responsibility for some of the CAPs in the coming years, but the lion's share of the work belongs to the Air Force. Meanwhile, Air Combat Command's senior general is getting a palpable sense of the fatigue experienced by RPA mission crews. "We've been in surges continuously for the last eight years," said Gen Herbert "Hawk" Carlisle during a September 2015 talk at the Center for Strategic and International Studies in Washington. "We went from 21 CAPs in 2008 to 65 CAPs."[3] He further remarked that the Air Force is the smallest it has been since the service's founding in 1947, with the fewest personnel and the least number of aircraft, including RPAs.[4] Critical manpower shortages in the intelligence officer career field might also be connected to the stress of working at surge capacity.[5]

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Yet, the Defense Department and the intelligence community's demand for ISR shows no signs of abatement. How can we balance their demands and improve the DCGS over the next four years? This analysis seeks to explore the answers to this important question—specifically, by addressing combat automation and a new focus on intelligence projects rather than intelligence products.

Working Smarter with Combat Automation

Stress upon DCGS Airmen—those assigned to the Predator and Reaper career fields in particular—has been increasingly documented since early last year. A March 2015 study published in *Military Medicine* reported that 20 percent of DCGS operators self-reported varying degrees of fatigue or psychological stress.[6] Six months later, Col Troy Jackson, head of the Air Force's Culture and Process Improvement Program, pointed out in a subsequent interview that "Airmen in this career field are being exhausted with no end in sight; we want to fix this."[7] An Air Combat Command study on the subject commissioned by the program seems to acknowledge this fact, and ultimately the Air Force will undertake 140 recommendations to improve RPA operations.[8] DCGS mission crews have preemptively started to reduce their daily, nightly, and midshifts from 12-plus hours to 8.

Further, the service should undertake other, more palliative, measures to reduce mission fatigue. Most, if not all, of these solutions involve what Capt Michael Byrnes calls "combat automation," a term he coins in "Dark Horizon," his trenchant contribution to the *Air and Space Power Journal*'s "Nightfall" series of articles. Combat automation is "the transfer of a task normally performed by an operator of a military aircraft to the control of an automated system, typically a digital computer."[9] Some commonly used examples of combat automation, according to Byrnes, include devices like autopilots or modern navigation systems. For the purposes of this article, we can adapt Byrnes's definition and supplant "aircraft" with "DCGS weapons system."

Some measure of combat automation in the DCGS weapons system can be achieved by using commonly available tools. Off-the-shelf technologies, such as speech-to-text software, could reduce the time that mission operations commanders or tactical communicators spend with computer keyboards manually placing messages into Internet relay chat windows. Other means to reduce fatigue—such as software applications that could quickly aggregate large amounts of data—are not quite off-the-shelf: they might require more bespoke solutions instead. Advanced computer algorithms or programming code can be employed to inspect full motion video products for aberrations, abnormalities, or mistakes, greatly reducing the time spent by mission operations commanders or imagery mission supervisors quality-checking analysts' work before it reaches the customer. RAND's Project Air Force proposed similar measures in 2012. Automatic target-recognition technologies can help imagery analysts and screeners maintain "nonhuman eyes" on full motion video and cue them to view predetermined areas of interest.[10]

The advent of cloud computing over the last half decade also presents exciting prospects for cross-domain solutions. A Citrix-based computer architecture can facilitate mission crew members' shifts between classified and unclassified computer

networks. Such architecture might also reduce the time necessary to access—or even the desire for—shared computer drives or folders. Most importantly, however, it could also bridge the gaps between data storage systems such as the Unified Collection Operations Reporting Network, ISR Assessment Tool, and Skynet. All of these disparate systems, administered by diffuse entities, track similar, mission-related information. Finally, advanced algorithms can automatically create postmission summaries—or any report, for that matter—with free-text syntax so precise that the computer-generated report is virtually indistinguishable from the human-generated one.[11]

Toward a New Model

The DCGS weapons system's mission is CPAD: the collection, processing, exploitation, analysis, and dissemination of intelligence.[12] However, this article proposes that CPAD is in fact a method or a means of attaining heightened awareness of one's own battlespace. It should not be an end unto itself. An unpublished white paper on the subject of CPAD as a methodology for intelligence work posits that the weapons system would be better suited to answering fundamental intelligence questions contained in documents such as commanders' priority intelligence requirements if it departed from a product-centric approach and adopted a project-based one.[13]

On the one hand, a product-centric approach concentrates on producing intelligence products almost for the sake of production. The weapons system, in this regard, is like an assembly line whose governing tenets are quantity, frequency, and a machine-like predictability. This construct also has a very high regard for statistics that specifically measure quantity, as opposed to the quality of the intelligence produced or its impact on battlefield decision making. On the other hand, a project-based approach not only would treat priority intelligence requirements as going concerns but also would be in conformance with the all-source methodologies adopted by most of the intelligence community's agencies. At these agencies, intelligence projects begin with strategic questions such as, "Will the enemy employ WMD [weapons of mass destruction]?"[14] Teams in the Air Force's ISR weapons system should be built and resourced similarly. The teams' size or scope can be scalable to answer more tactical questions such as, "How will the adversary employ WMDs?" or "What means will it use to cover or conceal its activities?" Routinely answering questions like these can help analysts become more conversant with regional ballistic missiles defense or the threat of using WMDs posed by transnational groups like the Islamic State. As a result, teams will unite with a common purpose, helping build competition and morale. Employing this method might also reduce the malaise that comes from the product-centric approach. Most importantly, it might mean greater involvement from the weapons system's DCGS analysis and reporting teams, which could use the predictive techniques proposed here and help decision makers on the ground see crises as they emerge, instead of reporting them in retrospect.

In the meantime, more stressors on the weapons system and its operators will arise. Between now and 2019, the Air Force should work toward a new CAP crew-manning scheme—one in which automation meets common sense. We may not be

able to reduce either the demand for ISR or fatigue on our Airmen. Nevertheless, we may yet have it in our power to increase their morale and revitalize the weapons system by using the measures proposed here and renewing their commitment to a common purpose—to answer our field commanders' critical intelligence questions more efficiently and effectively. ✪

Notes

1. Gordon Lubold, "Pentagon to Sharply Expand U.S. Drone Flights over Next Four Years," *Wall Street Journal*, 16 August 2015, http://www.wsj.com/articles/pentagon-to-add-drone-flights-1439768451.

2. Brian W. Everstine, "Don't Fear the Reaper," *Air Force Magazine* 99, no. 2 (February 2016): 18–23, http://www.airforcemag.com/MagazineArchive/Documents/2016/February%202016/0216reaper.pdf.

3. Mark Pomerleau, "Carlisle: Overworked Airmen Can't Train for Future Threats," Defense Systems, 18 September 2015, https://defensesystems.com/Articles/2015/09/18/Hawk-Carlisle-Air-Force-training-shortfall.aspx.

4. Ibid. The Air Force's inventory includes more than 140 Predators and nearly 250 Reapers. See Tom Kaminski, "USAF TACAIR: Combat Edge," *Air Forces Monthly*, no. 335 (February 2016): 44–59.

5. Department of the Air Force, memorandum, subject: Air Reserve Component (ARC) 14N Intelligence Officer Voluntary Limited Period of Active Duty (VLPAD) Program Implementation and Eligibility Criteria, 17 November 2015.

6. Lillian Prince et al., "Reassessment of Psychological Distress and Post-Traumatic Stress Disorder in United States Air Force Distributed Common Ground System Operators," *Military Medicine*, no. 180 (March 2015): 172. The authors study stressors that contribute to fatigue in the DCGS, including "long hours, rotating shift work, sustaining vigilance, and processing continuous auditory and visual data during aerial missions." The sample size of the researchers' survey encompassed 1,091 DCGS intelligence operators and 447 nonintelligence support personnel. They estimated that their results represented 31 percent of Air Force intelligence organizations (p. 173).

7. Shaun Eagan, "New ACC Program Begins, Aimed to Improve MQ-1/9 Community," US Air Force, 1 September 2015, http://www.af.mil/News/ArticleDisplay/tabid/223/Article/615577/new-acc-program-begins-aimed-to-improve-mq-19-community.aspx.

8. Everstine, "Don't Fear the Reaper," 3.

9. Capt Michael W. Byrnes, "Dark Horizon: Airpower Revolution on a Razor's Edge—Part Two of the 'Nightfall' Series," *Air and Space Power Journal* 29, no. 5 (September–October 2015): 33, http://www.airpower.maxwell.af.mil/digital/pdf/issues/2015/ASPJ-Sep-Oct-2015.pdf.

10. Lance Menthe et al., *The Future of Air Force Motion Imagery Exploitation: Lessons from the Commercial World* (Santa Monica, CA: RAND Corporation, 2012), 8–9, http://www.rand.org/content/dam/rand/pubs/technical_reports/2012/RAND_TR1133.pdf.

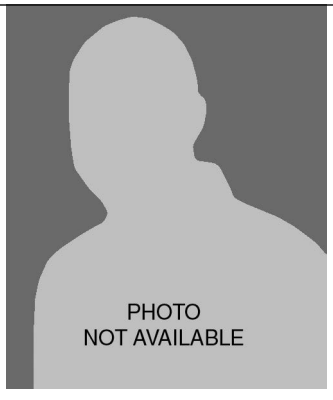
11. A June 2015 article in *Harper's Magazine* lists papers published by the Institute of Electrical and Electronics Engineers but retracted after someone discovered that they had been written by free-text-simulating algorithms. The list includes titles such as "A Methodology for the Exploration of Web Browsers" and "The Effect of Pervasive Algorithms on Artificial Intelligence." See "Bot for Teacher" *Harper's Magazine*, June 2015, 14. Interestingly, Captain Byrnes's work posits that senior leaders might have an aversion to automation generally. In the pilot's case, software might simplify decision making too much, and the physical act of flying one's craft "would cease to be so." A similar argument for intelligence work might hold true—that with so much computer programming, human cognition would be oversimplified and would cease to be true analysis. Byrnes, "Dark Horizon," 44.

12. "Air Force Distributed Common Ground System," US Air Force, 31 October 2015, http://www.af.mil/AboutUs/FactSheets/Display/tabid/224/Article/104525/air-force-distributed-common-ground-system.aspx.

13. Lt Col David Vernal, "ISR Efforts: A Project-Based Approach to ISR Capability, Force Presentation, and ISR Assessment," unpublished white paper, 2015.

14. Carl Rhodes, Jeff Hagen, and Mark Westergren, *A Strategies-to-Tasks Framework for Planning and Executing Intelligence, Surveillance, and Reconnaissance (ISR) Operations* (Santa Monica, CA: RAND Cor-

poration, 2007), 9, http://www.rand.org/content/dam/rand/pubs/technical_reports/2007/RAND_TR434.pdf. The authors of this study, who pose a similar question in their work, propose introducing a more deliberate planning method to resolve the disparity between the scarcity of intelligence resources and customers' demands for them.



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